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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,455	12/03/2004	Michel Puech	Q84452	2876
23373	7590	08/15/2007	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			OLSEN, ALLAN W	
			ART UNIT	PAPER NUMBER
			1763	
			MAIL DATE	DELIVERY MODE
			08/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/516,455

Applicant(s)

PUECH, MICHEL

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 May 2007 and 28 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 5-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Applicant's election without traverse of Group I (method claims 1-4) in the reply filed on 18 May 2007 is acknowledged.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites "...followed by alternating active etching during which the...". It is unclear as to what is being alternated with the active etching.

Claim 4 recites the limitation "...wherein the active etching comprises...". There is insufficient antecedent basis for "the active etching" limitation in the claim.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,456,796 issued to Gupta et al. (hereinafter, Gupta).**

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Gupta teaches ramping up the power level in a plasma reactor (abstract; Figure 2b; column 3, lines 6-38column 2, lines 44-45).

Gupta teaches a plasma etching method wherein a gas that is inert for the substrate is injected into the reaction chamber and the power of the plasma excitation electromagnetic wave is raised progressively until the appropriate nominal power is reached, thereby forming an inert gas plasma, which would progressively heat up the plasma chamber's leakproof wall of dielectric material. Gupta teaches injecting a reactive gas into the reaction chamber to replace the inert gas and to perform etching by the plasma of the active gas. Note the following excerpt from column 5:

Thus, it is preferred  
when practicing this embodiment of the present invention  
for these applications to initiate and slowly ramp the plasma  
power level in the presence of an inert gas, such as Argon. 35  
In this way contaminants are not agitated by the plasma  
ramp and contamination is minimized, as taught above.  
When the plasma is at its full power level (indicated by  
numeric designator 23 on FIG. 2b), the flow of inert gas to 40  
the reaction chamber may be stopped and the desired  
reactant gas is introduced into the chamber.

Gupta does not explicitly teach an inductively coupled plasma process wherein the substrate is biased.

It would have been obvious to one skilled in the art at the time the invention was made to carry out Gupta's method in an inductively-coupled plasma apparatus while biasing the substrate because Gupta states, in column 2:

50 The present invention has  
application in any plasma tool, such as those that are used in  
deposition, etching, or in-situ dry clean processes on a  
chemical vapor deposition ("CVD"), etch, or physical vapor  
deposition ("PVD") system.

and in column 4:

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55 Thus, specific details of reaction chamber construction and  
electrode arrangement therein; actual RF signal generation  
and control, and plasma frequency/power levels are either  
considered well known or a matter of choice.

65 It is expected that the present invention will find broad  
application in any process chamber employing a plasma as  
part of a process step.

Furthermore, the examiner takes Official Notice that the biasing of the substrate during an inductively coupled plasma process is an extremely common mode of plasma processing. Therefore, in view of the above noted teachings of Gupta, it is likely that the skilled artisan would immediately envisage the claimed mode of plasma processing.

Gupta does not teach progressively increasing the plasma excitation power in a manner to ensure that the thermal shock applied to the leakproof wall remains below a wall-destroying threshold.

It would have been obvious to one skilled in the art, at the time the invention was made, to operate the plasma apparatus in a manner that would not destroy the apparatus.

Gupta does not teach progressively establishing the plasma excitation power at the beginning of a reaction chamber's operation following a period of inactivity. And, Gupta does not teach the plasma process comprises a succession of etching periods that use fluorine-containing gas and passivation periods that use an etching passivation gas.

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It would have been obvious to one skilled in the art, at the time the invention was made, to use Gupta's method when initiating the plasma for all plasma process, including one at the beginning of a reaction chamber's operation, following a period of inactivity, and including a plasma process that comprises a succession of etching periods that use fluorine-containing gas and passivation periods that use an etching passivation gas because the benefit of reducing or eliminating wafer contamination by avoiding stirring up and circulating particles within the reaction chamber (column 3, lines 6-15) would be realized during any plasma start-up, including a plasma process that takes place following a period of inactivity and including a plasma process that comprises a succession of etching periods, which use a fluorine-containing gas, and passivation periods that use an etching passivation gas. The examiner takes Official notice that the Bosch process, which is a well-known and widely used plasma processing technique, comprising a succession of etching periods, using a fluorine-containing gas, and passivation periods using an etching passivation gas.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Allan Olsen". The signature is stylized with a large, looped "O" and a long, sweeping underline.

Allan Olsen  
Primary Examiner  
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